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WHAT IS CLAIMED IS:

1. A protein that preserves progenitor cells, wherein the protein has an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, or has an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD.

2. A protein according to Claim 1, wherein the protein comprises a heterodimer comprising an alpha polypeptide having an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD, and a beta polypeptide having an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD.

3. A protein according to Claim 1, wherein the protein has an amino acid sequence comprising TDSYVVAVEFD (SEQ ID NO:4).

4. A protein according to Claim 1, wherein the protein has an amino acid sequence comprising AQSLSFSFTKFDLD (SEQ ID NO:2)

5. A protein according to Claim 2, wherein the protein comprises two or more heterodimers.

6. A protein according to Claim 5, wherein the protein is tetrameric, comprising two identical heterodimers.

7. A protein according to Claim 1, wherein the protein is a mannose/glucose-specific legume lectin.

8. A protein according to Claim 7, wherein the protein is obtained from a legume from the tribe Phaseoleae.

9. A protein according to Claim 8, wherein the protein is obtained from kidney beans, hyacinth beans, or black-eyed peas.

10. A protein according to Claim 1, wherein the progenitor cells are at least unipotent progenitor cells.

11. A protein according to Claim 1, wherein the progenitor cells are pluripotent progenitor cells.

12. A protein according to Claim 1, wherein the progenitor cells are totipotent progenitor cells.

13. A protein according to Claim 1, wherein the progenitor cells comprise hematopoietic progenitor cells.

14. A protein according to Claim 1, wherein the progenitor cells comprise nerve, muscle, skin, gut, bone, kidney, liver, pancreas, or thymus progenitor cells.

15. A protein according to Claim 11, wherein the progenitor cells express the CD34 antigen.

16. A protein according to Claim 11, wherein the progenitor cells express the flk2 receptor.

17. A protein according to Claim 16, wherein the progenitor cells comprise cells modified to express flk2 receptors on their surface.

18. A protein according to Claim 16, wherein the protein has significant binding affinity for flk2 receptor on the cells, wherein binding of the protein with the flk2 receptor mediates the inhibition of differentiation of the cells.

19. A method for preserving progenitor cells, comprising contacting progenitor cells with a protein, having an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, or having an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD, in an amount sufficient to preserve the progenitor cells.

20. A method according to Claim 19, wherein the protein has an amino acid sequence comprising AQSLSFSFTKFDLD (SEQ ID NO:2)

21. A method according to Claim 19, wherein the protein has an amino acid sequence comprising TDSYVVAVEFD (SEQ ID NO:4).

22. A method according to Claim 19, wherein the protein is obtained from a legume from the tribe Phaseoleae.

23. A method according to Claim 22, wherein the protein is obtained from kidney beans, hyacinth beans, or black-eyed peas.

24. A method according to Claim 19, wherein the progenitor cells comprise hematopoietic progenitor cells.

25. A method according to Claim 24, wherein the progenitor cells comprise human cells which express the CD34 antigen and/or the flk2 receptor.

26. A method according to Claim 24, wherein the progenitor cells comprise murine cells which express the Sca antigen but which do not express mature blood cell lineage antigens.

27. A method according to Claim 19, wherein the method comprises contacting the progenitor cells with the protein in vitro, ex vivo, or in vivo.

28. A method according to Claim 19, wherein the method further comprises contacting the progenitor cells with flk2 ligand in an amount sufficient to selectively expand the number of progenitor cells without inducing differentiation thereof.

29. A method of treating a mammal in need of hematopoietic therapy, comprising:

a) obtaining a tissue sample from the mammal, the tissue sample comprising hematopoietic progenitor cells;

b) culturing the progenitor cells in the presence of a protein which preserves the progenitor cells, to provide cultured cells enriched in the progenitor cells, wherein the protein has an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, or has an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD;

c) subjecting the mammal to conditions sufficient to effect myeloablation; and

d) administering the cultured cells to the mammal following the myeloablation to reconstitute the hematopoietic system of the mammal.

30. A method according to Claim 29, wherein the myeloablation conditions comprise bone marrow irradiation, whole body irradiation, or chemically-induced myeloablation.

31. A method of enriching progenitor cells, comprising culturing progenitor cells in a progenitor-preserving amount of a protein having an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD, or having an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, wherein the protein specifically preserves the progenitor cells, and wherein the culturing is performed under conditions permitting preservation of progenitor cells while permitting the number of differentiated cells to decrease.

32. A method according to Claim 31, wherein the progenitor cells include primitive progenitor cells.

33. A method according to Claim 31, wherein the progenitor cells include mature progenitor cells.

34. A method according to Claim 31, wherein the progenitor cells are at least substantially free of stromal cells.

35. A method according to Claim 31, wherein said culturing conditions include culturing in a medium containing a cytotoxic agent which exhibits selective toxicity for proliferating cells.

36. A method according to Claim 35, wherein the cytotoxic agent is adriamycin, cyclophosphamide, taxol or other taxane, cisplatin, or 5-fluorouracil.

37. A method of improving hematopoietic competence in a mammal, comprising:

a) culturing a tissue sample comprising hematopoietic progenitor cells in a growth medium containing a protein having an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, or having an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD, in an amount sufficient to preserve the progenitor cells and to provide cultured cells enriched in the progenitor cells; and

b) transfusing the enriched cultured cells to the mammal to provide progenitor cells for generating blood cellular components in the mammal.

38. A method according to Claim 37, wherein the tissue sample comprises peripheral blood, umbilical cord blood, placental blood, or bone marrow.

39. A method according to Claim 38, wherein the tissue sample is autologous to the mammal.

40. A method according to Claim 37, wherein said tissue sample is at least substantially free of stromal cells.

41. A method according to Claim 37, further comprising ablating hematopoietic tissues in the mammal prior to the transfusing.

42. In a method of transfecting an exogenous DNA sequence into somatic cells, the improvement comprising transfecting progenitor cells selectively preserved by a protein having an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, or having an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD .

43. A composition for maintaining viability of progenitor cells ex vivo, comprising a cell growth medium and a protein which preserves progenitor cells, wherein the protein has an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, or has an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD.

44. A method for preserving progenitor cells in a mammal, comprising:

a) administering to said mammal a protein which specifically preserves progenitor cells, said protein having an amino acid sequence comprising AQSLSFSFTKFD (SEQ ID NO:1) and a molecular weight of about 12-20 kD, or having an amino acid sequence comprising VVAVEFD (SEQ ID NO:3) and a molecular weight of about 15-20 kD, in an amount sufficient to preserve progenitor cells of said mammal in a substantially non-proliferative state;

b) exposing the mammal to myeloablative conditions sufficient to effect ablation of proliferating myeloid cells but sparing non-proliferating progenitor cells; and

c) following said exposing, reestablishing proliferation or differentiation of the preserved progenitor cells.

45. A method according to Claim 44, wherein said reestablishing comprises administering to said mammal a cytokine in an amount sufficient to improve the viability of the progenitor cells

46. A method according to Claim 45, wherein said viability-improving cytokine is IL-1, IL-3, IL-6, IL-11, KL, or a combination thereof.

47. A method according to Claim 44, wherein said reestablishing comprises administering to said mammal a proliferation-stimulating amount of the flk2 ligand.